



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON, D.C. 20546

*Manned*

REPLY TO  
ATTN OF: GP

TO: KSI/Scientific & Technical Information Division  
Attention: Miss Winnie M. Morgan

FROM: GP/Office of Assistant General Counsel for  
Patent Matters

SUBJECT: Announcement of NASA-Owned U.S. Patents in STAR

In accordance with the procedures agreed upon by Code GP and Code KSI, the attached NASA-owned U.S. Patent is being forwarded for abstracting and announcement in NASA STAR.

The following information is provided:

U.S. Patent No. : 3,736,607

Government or  
Corporate Employee : U.S. Government

Supplementary Corporate  
Source (if applicable) : \_\_\_\_\_

NASA Patent Case No. : MSC-12393-1

NOTE - If this patent covers an invention made by a corporate employee of a NASA Contractor, the following is applicable:

Yes ☐ No ☒

Pursuant to Section 305(a) of the National Aeronautics and Space Act, the name of the Administrator of NASA appears on the first page of the patent; however, the name of the actual inventor (author) appears at the heading of column No. 1 of the Specification, following the words "... with respect to an invention of . . . ."

*Elizabeth A. Carter*

Elizabeth A. Carter

Enclosure

Copy of Patent cited above



[54] **LIFE RAFT STABILIZER**

[75] Inventors: **Matthew I. Radnofsky**, Seabrook;  
**James H. Barnett, Jr.**, Alvin; **Floyd L. Harrison**; **Ralph J. Marak**, both of Houston, all of Tex.

[73] Assignee: **The United States of America as represented by the Administrator of the National Aeronautics and Space Administration**, Washington, D.C.

[22] Filed: **Nov. 30, 1971**

[21] Appl. No.: **203,405**

[52] U.S. Cl. .... **9/2 A, 9/3, 9/11 A,**

**114/122**

[51] Int. Cl. .... **B63b 7/08, B63b 39/02**

[58] Field of Search ..... **9/2 A, 2 R, 2 C,**  
**9/11 A, 11 R, 3; 114/122**

[56] **References Cited**

**UNITED STATES PATENTS**

2,223,625 12/1940 Krupp ..... **9/11 A**

2,683,269 7/1954 Harkins ..... **114/122 X**  
3,155,992 11/1964 Shewmake et al. .... **9/11 A**

*Primary Examiner*—Duane A. Reger  
*Assistant Examiner*—Carl A. Rutledge  
*Attorney*—Russell E. Schlorff, Marvin F. Matthews and John R. Manning

[57] **ABSTRACT**

An improved life raft stabilizer for reducing rocking and substantially precluding capsizing. The stabilizer may be removably attached to the raft and is defined by flexible side walls which extend a considerable depth downwardly to one another in the water. The side walls, in conjunction with the floor of the raft, form a ballast enclosure. A weight is disposed in the bottom of the enclosure and water port means are provided in the walls thereof. Placement of the stabilizer in the water allows the weighted bottom to sink, producing submerged deployment thereof and permitting water to enter the enclosure through the port means, thus forming a ballast for the raft.

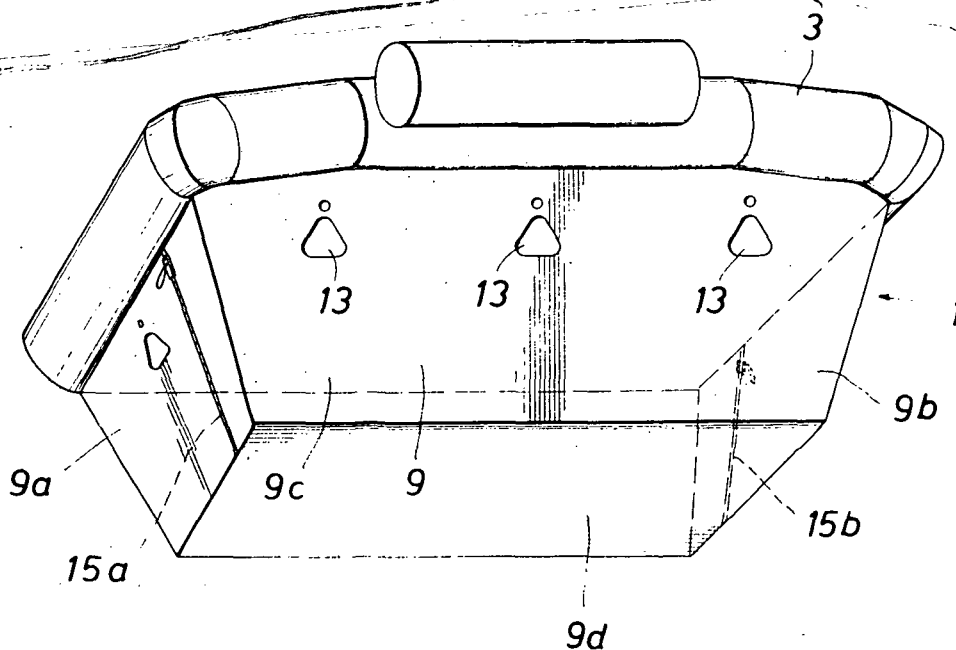
**6 Claims, 3 Drawing Figures**

**N73-26006**

(NASA-Case-MSC-12393-1) **LIFE RAFT**  
**STABILIZER Patent (NASA) 4 p CSCI 06G**

Unclas  
06482

00/02



50%

N73 26006

FIG. 1

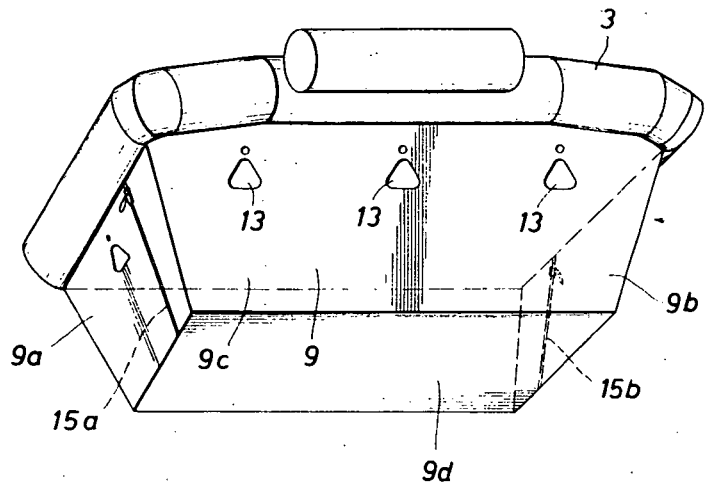


FIG. 2

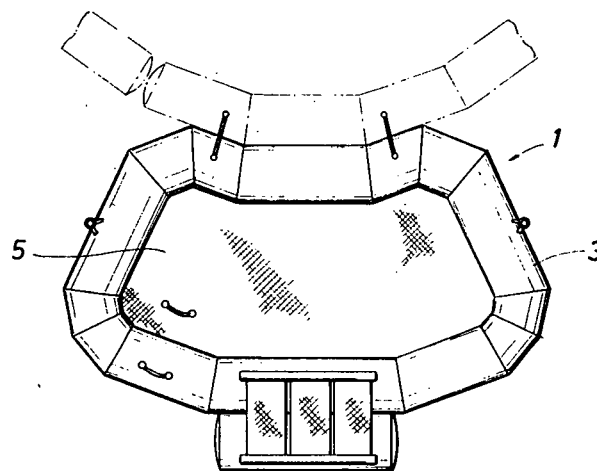
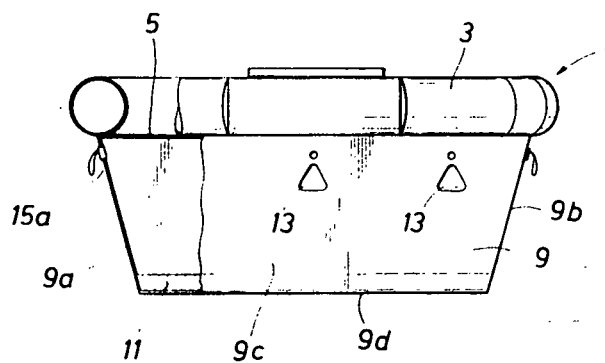


FIG. 3



**LIFE RAFT STABILIZER**

The invention described herein was made by employees of the United States Government and may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

**BACKGROUND OF THE INVENTION**

This invention pertains to improvements in life rafts. More particularly the invention pertains to an improved inflatable stabilizing system for use on life rafts and similar type vessels.

Pneumatically inflatable life rafts are characterized by numerous advantageous characteristics. For example, they occupy relatively small storage space by comparison to their deployed size. They are light weight and easily and quickly made ready for use. Their buoyancy and load carrying capacity are superior to practically all other types of floating vessels. Although these and numerous other features make pneumatically inflatable life rafts more attractive than most other forms of life support vessels, it is some of the very same features that contribute to their most severe drawback, namely a pronounced instability and tendency to capsize in open water.

Heretofore, the recognition of this disadvantage has been accompanied by numerous and diverse resolute attempts directed to its elimination. It has, for example, been suggested that the inflatable raft incorporate a plurality of stabilizing weights or ballast buckets deployed around the perimeter and interiorly of the raft. Also, it has been suggested that the inflatable rafts contain a compartment in the bottom thereof which may be filled with a weight or even with water so as to thereby form a stabilizing mass. Such a structure is shown in U.S. Pat. No. 2,223,625. While this and similar devices might afford some stabilizing effect, they are not conducive to reliable use in heavy seas because of a vulnerability to sudden capsizing from a single wave. Other less sophisticated approaches, such as the mere placement of a mass or weight on the floor of the raft, detract from the basic features of the raft itself, that is its ease of deployment, lightness of weight and superior buoyancy.

The present invention thus proposes a pneumatically inflatable raft having a water inflatable keel as an integral part thereof and which acts to stabilize the raft in a manner superior to any structure presently known. The water inflatable keel is constructed of the same materials as the raft itself, is formed integrally therewith, and thus detracts in no way from the principal features which characterize pneumatically inflatable rafts. In addition to reliably stabilizing the raft and substantially eliminating the possibility of capsizing in even heavy seas, the structure disclosed hereinafter contains means for adjusting the ballast resistance during towing of the raft, and means for expulsion of the water ballast from the keel so as to facilitate removal of the raft from the water. These and other features and advantages of the invention will become readily apparent upon a reading of the following detailed description, claims and drawings wherein like numerals denote like parts in the several views and wherein:

**DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a perspective view illustrating a life raft in-

corporating the improved stabilizing structure of the invention.

FIG. 2 illustrates a top view of the raft of FIG. 1.

FIG. 3 shows a side view in partial section of the raft of FIG. 1.

**DETAILED DESCRIPTION**

With reference now to the drawings, there is shown a raft 1 comprising main flotation tube 3 which may be made of vinyl, rubber or other material having pneumatic integrity. Although the planar form of the main flotation tube 3 will generally be of circular, square or rectangular configuration, it may take any shape depending upon the demands of its use. Therefore and for example it is shown in the drawings to be of semicircular configuration so as to readily adapt to and dock against the side of a space vehicle floating in the water. Integrally attached to the main flotation tube 3 is a floor 5 adapted to support the persons and supplies in the raft.

Extending downwardly from the main flotation tube 3 and removably connected thereto is the life raft stabilizer 9. The stabilizer comprises a plurality of integrally connected walls 9a, 9b, 9c and 9d extending downwardly from the main flotation tube 3. It is most important that the depth of the stabilizer walls be at least several times the diameter of the main flotation tube in order to lower the center of gravity and thus produce a reliable ballasting force upon the raft when it is in the water. A stabilizer depth in the range of 3 feet or more is suggested for the configuration of the raft shown in the drawing (FIG. 1). To still further enhance the center of gravity of the raft when the stabilizer 9 is filled with ballasting water, the stabilizer walls 9a-d are adapted to slope inwardly towards one another to take the form of a keel. Disposed in the bottom of stabilizer 9 is an appropriate weight 11 (FIG. 3) which, upon pneumatic deployment of the main flotation tube 3, causes stabilizer 9 to descend in the water. In so doing, water passes through entry ports 13 selectively positioned in certain of the stabilizer walls 9a-d. The water thus fills the chamber defined by the walls and the floor 5 of the raft, and thereby provides a stabilizing keel.

After the raft is deployed in the water, the need may subsequently arise for towing it or for maintaining it in relatively static position despite an ocean current. Either such objective would prove difficult, at best, with the contained water ballast described above. There is therefore provided zipper means 15a, 15b in opposing end walls of stabilizer 9. By opening both of the zipper means, the raft may be towed with relative facility since resistance of the water ballast is reduced to the resistance produced by a current flowing through the stabilizer 9. Similarly, if the raft is subjected to an ocean current when relative movement from a designated position is undesirable, the zipper facing the current direction may be closed while the other is opened. Thus the ballasting water in the stabilizer 9 will be relatively static by comparison to the current, thereby substantially reducing movement of the raft. Under still other circumstances, necessity may arise to remove the raft entirely from the water. This of course could not be readily accomplished with the substantial water ballast normally contained within the walls of stabilizer 9. In such event, both zippers 15a and 15b may be opened to permit quick and easy gravity expulsion of the ballast water as the raft is being removed.

From the above description it will be seen that the improved life raft stabilizer of the invention is extremely simple to construct and may, as a unit, be attached or detached from the raft by use of any number of conventional snaps or connector means. The inertia of the water ballast contained within the stabilizer tends to oppose sudden movement of the raft in a horizontal direction. A change in a vertical direction, such as tilting or lifting, is resisted by the weight and inertia of the water in the stabilizer. Rocking motion of the raft due to surface waves is substantially reduced by reason of the keel-like effect of the ballasting stabilizer. In addition, the water entry ports and weighted stabilizer provide for quick and effortless deployment while the cooperating zipper means impart a degree and type of navigational control which is unknown to pneumatically inflatable vessels.

While there has been described and illustrated a particular embodiment of the invention, it is to be understood that the invention is not to be restricted thereto, but it is intended to cover all modifications thereof which fall within the true spirit and scope of the claims appended hereto.

Having thus described the invention, that which is claimed and which is desired to be secured by United States Letters Patent is:

1. A stabilizer means adapted to be affixed to a floating body suspended in a fluid for reducing rocking and generally enhancing the stability thereof comprising:  
flexible wall means removably attachable to the floating body and configured so as to extend downwardly from the body a substantial distance and to one another to form a ballast enclosure,  
port means in said flexible wall means, and  
a weight means affixed to the bottom of said ballast enclosure for producing gravitational deployment

thereof, thereby causing fluid to flow into the enclosure through the port means and thus form a stabilizing ballast for the body.

2. The stabilizer means of claim 1 wherein the flexible wall means are in the general configuration of a keel.

3. The stabilizer means of claim 2 wherein the wall means of the stabilizer means is characterized by fluid control openings that may each be selectively opened so as to allow escape of the fluid in the ballast enclosure, or closed so as to maintain the fluid therein.

4. In a raft of the type generally used on open water and which is subject to capsizing therein, the improvement consisting of a stabilizer means removably attached to the raft for substantially precluding capsizing and reducing rocking of the raft, said stabilizer means comprising:

flexible wall means extending downwardly from the sides of the raft to one another so as to form a ballast enclosure,

port means in said flexible wall means, and  
a weight means affixed to the bottom of said ballast enclosure for producing submerged deployment thereof, thereby causing water to enter the enclosure through the port means and thus form a ballast which stabilizes the raft.

5. The combination raft-stabilizer means of claim 4 wherein the flexible wall means extending downwardly into the water are in the general configuration of a keel.

6. The combination raft-stabilizer means of claim 5 wherein the wall means of the stabilizer means is characterized by water control openings that may each be selectively opened so as to allow escape of the water in the ballast enclosure, or closed so as to maintain the water therein.

\* \* \* \* \*

40

45

50

55

60

65